

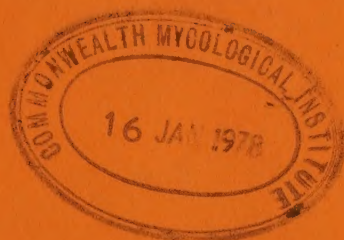
BRITISH HONDURAS

ANNUAL REPORT
of the
DEPARTMENT OF AGRICULTURE

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BSM	

FOR THE YEAR

1970



ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1970

PART I. GENERAL REVIEW OF AGRICULTURE:-

A. WEATHER CONDITIONS:-

Weather conditions were, in general, very favourable for agriculture. Total rainfall for the year was slightly below average, but the dry season was not prolonged and rainfall was well distributed with respect to time and by geographical areas. The dry season lasted from March to Mid-May. During the rest of the year some rain fell every month, the heaviest rainfall occurring during the months of July, August, September, October, and November. The customary short dry season during the month of August did not materialize. Frequent and heavy showers which were experienced during September rendered the mechanical harvesting of rice and corn somewhat difficult. The usual heavy showers of July caused occasional flooding of rivers and creeks, and resulted in the loss of crops by farmers who operated near to the river banks. This was particularly true for farmers in the Sibun River area.

For most of the year, the maximum shade temperature was of the order of 84°F, but during the hotter months day temperatures of 100°F were not uncommon. The temperature differential between day and night temperature was 68°F, and the lowest recorded temperature was 43°F at Cooma Cain in the Mountain Pineridge on February 4th.

The average relative humidity recorded at the Belize International Airport was 79%, at Central Farm 83%, at Savannah Forest Station 76%, and at Big Falls Ranch 81%. The climate was more humid in the interior areas and in river areas away from the coast.

Meteorological Data may be seen in Appendices I and II of this report.

B. EXPORT CROPS:-

Sugar Cane:-

The 1969/70 sugar crops was a record one. A total of 66,785 long tons of sugar were produced at the two sugar factories located at Libertad in the Corozal district and Tower Hill in the Orange Walk district respectively. Molasses production amounted to 26,397 long tons - also a record.

A grand total of 676, 175 long tons of cane were processed of which 312,197 tons were processed at Libertad and the remaining 363,978 tons at Tower Hill. Grinding lasted at Tower Hill from December 13th 1969 to June 10th, 1970, and at Libertad from December 8th, 1969 to July 25th, 1970. The following is a summary of statistics relating to the crops:-

Acreage harvested	29,800	acres
Tons Cane Reaped	676,175	tons
Tons Sugar Produced	66,785	"
Tons Molasses Produced	26,397	"
Tons Cane/acre	22.69	
Tons Sugar/acre	2.24	
Tons Cane/Ton Sugar	10.12	

Citrus:-

Deliveries of fruit for the 1969/70 crop reflected a 28% decrease over the previous year. A total of 815,201 contract boxes of fruit, comprised of 558,452 boxes of oranges and 256,749 boxes of grapefruit, were processed by the two factories operated by the British Honduras Fruit Co. and the Citrus Company of British Honduras Ltd. respectively.

The C.C.B.H. factory processed the entire grapefruit crop, and 77% of the orange crop. A survey of commercial citrus holdings revealed a total of 9,071 acres planted to this crop - 2,441 acres of grapefruit and 6,630 acres of oranges.

An advance price of B.H. \$1.05 was paid per contract box of grapefruit delivered at the factory. Early oranges attracted an advance price of B.H. \$1.00 per contract box, while late oranges fetched an advance price of B.H. \$1.10 per box. The table below gives the distribution of production by District for the 1969/70 crop:-

Distribution of Citrus Production by Districts, 1969/70

	D I S T R I C T			
	Cayo	Belize	Stann Creek	TOTAL
No. of Registered Growers	8	1	238	247
Acreage of Grapefruit	128	180	2,133	2,441
Acreage of Oranges	958	10	5,662	6,630
Total Citrus Acreage	1,086	190	7,795	9,071
*Grapefruit delivered	2,011	Nil	254,738	256,749
*Oranges delivered	50,726	140	507,586	558,452
*Total Citrus deliveries	52,737	140	762,324	815,201

* Contract boxes = 80 lbs. nett for grapefruit, and
90 lbs. nett for oranges.

Bananas:-

The banana industry, once an export industry of moderate importance, remained moribund throughout the year under review. The major problems were a breakdown in marketing arrangements and the infestation of banana plantations by Sigatoka disease (*Mycosphaerella musicola*). No exports of banana were recorded during the year, although the area under bananas was estimated at 1200 acres.

Cacao:-

Central American Investments Ltd. on the Hummingbird highway carried out maintenance of some fields and undertook the rehabilitation of others. Purchases of raw cacao beans were made from indigenous Maya Indian producers of the Toledo district and from Roaring River Estates. Exports of raw cacao beans during 1970 amounted to 37,010 lbs. and was valued at \$7,782 B.H.

Cucumbers:-

Savannah Products Ltd. and Belize Offshore Growers Ltd. continued to produce cucumbers for export to the United States winter market. Exports during 1970 totalled 7,839,268 lbs. and were valued at \$186,108 B.H.

C. FOOD CROPS:-

Rice:-

4,383 acres were planted to rice during 1970, and an estimated 7.7 million lbs. of rice paddy were harvested from this area. The table below gives the distribution of plantings among districts:-

<u>District</u>	<u>Acreage Cultivated</u>
Belize	1182
Cayo	100
Stann Creek	113
Toledo	2,988
TOTAL	<u>4,383</u>

The 1970 rice crop in the Toledo district was a bumper one. A record 4,767,526 lbs. of paddy were purchased by the Marketing Board from this district. This favourable increase in rice production is largely due to the efforts of Government to encourage expansion of the industry through the provision of credit and mechanical services.

The Department of Agriculture operated mechanised rice schemes at Mafredi and San Pedro Columbia in the Toledo district and at Rancho Dolores in the Belize district. Some problems were experienced at Rancho Dolores when heavy rains inundated the rice fields and rendered mechanical harvesting extremely difficult with the machinery then available. Fully matured rice lodged and some thirty acres of rice were completely lost.

Elsewhere, in the Manatee area of the Stann Creek district an estimated fifty acres of rice were lost when a fungus attacked the developing grains.

Although a large part of the total production still takes place by 'shifting cultivation', a healthy trend towards mechanization has been started - in some areas on a co-operative basis. If development continues along these lines, the country should soon become self-sufficient in rice, eventually building up an exportable surplus.

Corn:-

The area planted to corn during 1970 was approximately 25,000 acres distributed as follows:-

<u>District</u>	<u>Acreage</u>
Toledo	5,752
Stann Creek	509
Cayo	6,249
Corozal	1,600
Orange Walk and Belize	10,890
TOTAL	<u>25,000</u>

An estimated 35 million lbs. of dried grain were harvested from this crop. This reflects an increase in production of over 100% when compared with the previous crop.

The Mennonite communities at Spanish Lookout in the Cayo district and Blue Creek in the Orange Walk district continued to play a significant role in corn production. They are almost totally responsible for mechanised corn production, and obtain yields of over 2000 lbs./acre as compared to the average yield of 900 - 1,000 lbs./acre obtained by 'shifting cultivators'. Two farmers co-operatives in the Corozal District - the Patchakan and the San Joaquin Farmers' co-operatives - initiated mechanised corn production projects involving 53 and 75 acres respectively.

A welcome increase was noted in the number of farmers using improved varieties of corn. Farmers are becoming more and more aware of the benefits of improved technology, albeit they are still somewhat hesitant to adopt improved production practices. It is envisaged that corn production will expand rapidly over the next few years as a corollary of the rapid growth of the livestock industry.

Red Kidney Beans:-

A total of 7,534 acres were planted to Red Kidney beans and this area was distributed as follows:-

<u>District</u>	<u>Acreage Planted</u>
Toledo	592
Corozal	100
Cayo	3,800
Stann Creek	Nil
Orange Walk & Belize	<u>3,042</u>
TOTAL	<u>7,534</u>

Relatively good weather resulted in a fair crop with yields ranging from 700 - 1,000 lbs./acre. Again, the Mennonites accounted for a significant proportion of total production which was estimated at 4,050,000 lbs.

One of the major deterrents to the expansion of production is the high cost of seeds which have to be imported and which often arrive after the optimum planting time has passed. Besides this, the crop is highly susceptible to the vagaries of pests and diseases, and to weather conditions.

Root Crops:-

Root crops continued to be grown for local consumption mainly on small plots, sometimes interplanted with corn and other cash crops. The following is a summary of plantings of root crops during 1970:-

<u>Crop</u>	<u>Acreage Planted</u>
Cassava	259
Coco yams	102
Yams	46
Sweet Potatoes	<u>32</u>
TOTAL	<u>439</u>

These crops continue to be produced by traditional techniques with associated low yields.

Vegetables:-

Supplies of vegetables were again inadequate during the off-season, and had to be supplemented by importations from Mexico. Most of the vegetables produced locally were grown by the Mennonites of Spanish Lookout and Pilgrimage Valley and by farmers of the Macaw Bank area. Gluts and correspondingly low returns are common during the most favourable production periods with long periods of comparative scarcity and high prices.

Other Crops:-

A considerable amount of crops such as mangoes, cashew, avocado, pineapples, watermelons, and other fruits were grown for local consumption mainly on non-commercial holdings. Lack of organisation in production and marketing makes it extremely difficult to obtain reasonable estimates of production.

D. THE LIVESTOCK INDUSTRY:-

Cattle:-

The year 1970 marked a turning point in the history of the cattle industry in Belize.

The Belize Meat Packers' abattoir began its operations, although the importance of this event was overshadowed to some extent by the fact that at year's end the abattoir was still not in sight of U.S.D.A. certification for exporting beef.

As a result of earlier measures taken by Government, the cattle population showed a marked upward trend. A cattle census carried out in December, 1970 indicated a cattle population of 38,399 head - reflecting a 34% increase over the 1968 figures. The distribution of herds according to districts may be obtained from Appendices III and IV of this report.

Unfortunately, this favourable development with respect to livestock numbers was not paralleled by developments in the field of marketing. Auction markets, which were a significant feature of the revival of the cattle industry in 1969, declined dramatically during the year, these markets were moribund due to resistance from buyers to the retailment price control structure.

Following the reduction in 1969 of beef supplies which occurred as a temporary consequence of slaughter control measures, there was a considerable increase in the supply during 1970 as can be seen from the comparative data below:-

BEEF CONSUMPTION, 1968 - 1970

<u>Year</u>	<u>Beef Consumption (lbs.)</u>
1968	1,304,856
1969	960,650
1970	1,045,517

The dairy industry is as yet in its infancy. Western Dairies Ltd. of Spanish Lookout continued to supply pasteurized milk to consumers in Belize City and Belmopan. The fact that there is tremendous need for the promotion of a national dairy industry is readily attested by the \$3,137,743 worth of dairy products which were imported into the country during 1970. The breakdown of these imports was as follows:-

<u>Products</u>	<u>Quantity ('00 lbs.)</u>	<u>Value (B.H. \$)</u>
Milk and Cream, fresh	6,665	182,361
Milk and Cream, evaporated or condensed	65,673	1,638,945
	4,926	620,098
Milk and cream, powdered	6,122	449,052
Butter	9,737	508,863
Cheese		
TOTAL	93,123	\$3,137,743

Pigs:-

The pig population is believed to have remained fairly static over the year. A total of 6,542 heads were slaughtered yielding a total dressed weight of 448,413 lbs. The distribution of slaughterings by districts is shown in Appendix V to this report.

Poultry:-

A considerable amount of poultry was produced in 'backyard' operations, and the Mennonite communities continued to be the main commercial producers. There is still a significant need for expansion in the local production of broilers. This is evidenced by the fact that 2,071,600 lbs. of poultry meat were imported during 1970 at an estimated cost of B.H. \$856,451.

The country was self-sufficient in table eggs and a small surplus of 10,281 dozens was exported to Mexico during the year. Some 24,619 'live' birds were also exported to Mexico.

Apiculture:-

The production of honey during 1970 decreased by approximately 5% to 107,447 lbs. It may be recalled that during 1969, the beekeeping industry suffered as a result of the aerial application of insecticides to canefields. Several apiaries were completely wiped out and, as a result, the interest of beekeepers waned, and production declined to less than a quarter of its former level. This decline is reflected in the comparative production data set out below:-

HONEY PRODUCTION, 1967 - 1970

<u>Year</u>	<u>Production (lbs.)</u>
1967	425,078
1968	468,158
1969	112,964
1970	107,447

Exports of natural honey to the United Kingdom totalled 92,400 lbs. The F.O.B. price for honey increased from £96 sterling to £104 sterling during the course of the year.

The distribution of apiaries, hives, and beekeepers as at 31st December, 1970 was as follows:

<u>District</u>	<u>No. of Apiaries</u>	<u>No. of Hives</u>	<u>No. of Beekeepers</u>
Corozal	28	790	23
Orange Walk	35	903	23
Belize	4	74	4
Cayo	4	58	5
Stann Creek	4	60	4
Toledo	2	64	2

PART II. WORK OF THE DEPARTMENT

A. POLICIES:-

The basic policies of the Department remained essentially the same, namely:-

(1) To obtain the maximum degree of self-sufficiency in respect of all crops and livestock products which can be economically produced within the country.

(2) To improve the quality, quantity, and range of export crops.

(3) To develop the livestock industry and promote an export trade in the products thereof.

(4) To conserve the natural resources.

(5) To promote farming as a way of life based on a sound system of agriculture.

(6) To ensure the fullest possible integration between skill and capital inputs by indigenous farmers, and that national farmers participate actively in the agricultural development of the country.

B. STAFFING:-

The position with respect to staff improved considerably during the year under review as five qualified nationals returned from training abroad. Four had Bachelor of Science degrees in agriculture (or the equivalent) and were consequently posted as Agricultural Officers, while the fifth achieved the Doctor of Veterinary Medicine degree and was posted as Veterinary (Extension) Officer. Several key posts remained unfilled, however, including the posts of Agronomist, agricultural chemist, and Entomologist. A list of senior personnel as at 31st December, 1970 is contained in Appendix VI of this report.

C. AGRICULTURAL RESEARCH:-

(1) CROPS RESEARCH:-

Onion Variety and Fertilizer Trial:-

Objective:- To evaluate the response of three onion varieties to two levels of fertilizer.

Materials and Methods:- The trial was planted on the 24th November, 1969 at Central Farm. The experimental design consisted of four blocks, three levels of fertilizer (0, 100 and 200 lbs./acre) and three types of complete fertilizer (10:15:20; 13:26:13; and 18:46:0). On the 25th November the trial was sprayed with Gramoxone at the rate of 1½ quarts per acre, and approximately 95% weed control was achieved. The area was also dusted with Aldrin at the rate of 2 lbs. active ingredient per acre to control soil-borne insects.

Observations taken on the 28th November showed that seeds had started germinating. Germination, however, subsequently proved to be poor and it was decided to transplant some of the plants into other plots with similar treatment in order to achieve a good plant population. The trial was then condensed into one block, and some of the fertilizer treatments discontinued. The trial was harvested in April.

Result and Discussions:-

Yield of Onions in lbs./acre

<u>Fertilizer Treatments</u>	<u>Varieties</u>		
	<u>Red Creole</u>	<u>Yellow Granex Fl Hybrid</u>	<u>Early white Grano</u>
100 lbs. - 10:15:20	9,700	8,800	8,200
100 lbs. - 13:26:13	6,800	7,900	-
100 lbs. - 18:46:0	8,200	10,600	-
200 lbs. - 10:15:20	8,100	4,700	7,000
200 lbs. - 13:26:13	7,800	10,000	-
200 lbs. - 18:46:0	6,900	6,200	8,400
Control	9,400	4,800	9,600

Note: - denotes that fertilizer treatments were discontinued due to poor stands.

The results of the trial are inconclusive and it will be necessary to undertake further trials before any firm recommendations concerning the fertilization of onions can be made.

(2) PASTURE RESEARCH:-

FORAGE MIXTURE PRELIMINARY TRIAL, 1968 - 70

"Grass Alone" versus "Grass plus Centro"

SUMMARY

A forage mixture trial was laid down on 30th August 1967 but had to be replanted in September because a short drought caused the death of the plants. The first cut was done on 31st January 1968 followed by twelve more cuts over the 2 year period. The final results show that:-

i) in terms of yield of total crude protein per acre Carib grass (Eriochloa polystachya) performed best among the pasture grasses.

ii) Merker grass (Pennisetum purpureum) gave the best overall performance.

iii) The "grass plus Centro" plots were better overall and individually in their performance in respect of total crude protein yield.

iv) Carib grass performed better in response to nitrogen fertilizer than to the planted legume.

INTRODUCTION AND OBJECTIVE

Legumes are able to produce nitrogen for use by crops through symbiotic relationship with bacteria in the soil. It is often the cause that more nitrogen is produced than is required by the legume; this is released in the soil and can be used by a companion crop - in this case, grass. Legumes in themselves with their high protein value offer to animals a ready source of rich nitrogen forage.

Since the all-too-frequent unavailability and the prohibition cost of fertilizers decidedly inhibits to a great extent the amounts or types that can be applied to pastures, it was decided to conduct two preliminary trials at Central Farm in the Cayo District. This is the second of those trials; the results of the first were reported in the 1969 Annual Report.

The objective of this trial was that of determining what grass or grasses could grow well in conjunction with Centro (Centro sema pubescens) and the effect this legume would have on yield and protein content of the grasses.

Material & Methods

1. Site: Pasture Introduction Block, Central Farm
2. Soil Type: Cuxu red-brown clay loam
3. Design of Experiment: Randomized complete Block with split plots and no replication.
4. Fertilizer:

After replanting in September, the first application of fertilizer was made in December when a mixture of Sulphate of Ammonia and Triple Superphosphate was applied to all plots at an equivalent rate of 100 lbs. per acre. After the first cut on 31st January 1968 Urea was applied to the grasses alone at 50 lbs./acre. A mixture of triple superphosphate and muriate of potash was applied to all plots on 24th September '68 at 100 lbs each per acre; and urea and triple superphosphate applied in November after cutting.

Subsequent fertilizer application was based on a policy of applying 15 ozs each Urea and triple superphosphate to the grass plots and 15 ozs. triple superphosphate alone to the legumes - grass plots after each harvest. This commenced on 21st January 1969.

5. Grass species:-

Creeping Guinea grass (Panicum maximum var. Embu)

Merker grass (Pennisetum purpureum)

Kazungulu Seteria (Setaria sphacelata)

Gatton Panio (Panicum maximum var. antidotale)

Nandi Seteria (Setaria sphacelata)

Carib Grass (Eriochloa polystachya)

Biloela Buffel (Cenchrus ciliaris var.)

Pangola grass	(<u>Digitaria decumbens</u>)
Green Panic	(<u>Panicum maximum</u> var trichoglume)
Guinea Grass	(<u>Panicum maximum</u>)

PLANTINGS & ESTABLISHMENT

Twenty plots each 12 feet x 36 feet were pegged and planted to grass and legume on 30th August 1967. The grasses were planted in rows 2 feet apart; legumes were presumably planted from seed as no record is found on the method of its planting. Because of a severe drought experienced during this month, the entire trial had to be replanted in September. The trial was cut back for the first time in December but no weight were taken; the entire area received triple superphosphate and sulphate of ammonia at a rate of 100 lbs. each per acre. The first recorded harvest was taken on 31st January 1968.

RESULTS AND DISCUSSION

The period of this experiment extended over 24 months of cutting during which time thirteen harvests were done, averaging approximately one harvest every 7 weeks. As would be expected harvests were more frequent during the wet months and less so during the early months of the year.

The results are presented in terms of total crude protein content on a dry weight basis over these twenty-four months. After approximately one year of cutting there was markedly increased stands of the following grasses: - Creeping Guinea, Kazungulu, Nandi and Green Panic. Guinea grass stand also was reduced but not noticeably until October 1969 when the weather was quite dry.

TABLE I

TOTAL CRUDE PROTEIN (Dry Wt. basis)

(lb./acre)

S A M P L E S & Centro	1st Cut.	2nd Cut		3rd Cut		4th Cut		5th Cut		6th Cut		7th Cut	
Merker & C	355.0	259.6	258.0	571.1	1623.6	999.4	564.2	310.3	222.2	168.5	626.9	196.8	217.2
Merker													102.8
Cr. Guinea & C	92.2	99.7	286.1	249.9	281.2	126.0	202.4	30.2	94.2	10.8	142.5	37.5	47.8
Cr. Guinea													28.8
Kazungulu & C	123.6	48.1	273.6	187.4	269.0	123.9	198.7	20.1	68.8	17.4	173.4	48.0	75.7
Kazungulu													63.2
Gat. Panic & C	131.2	96.3	186.0	420.7	290.3	170.9	182.7	73.6	177.3	50.9	91.6	34.3	50.7
Gat. Panic													97.8
Nandi & C	136.0	67.8	326.1	246.7	502.1	52.7	130.8	31.6	36.8	6.7	57.3	52.0	140.4
Nandi													43.6
Carib & C	186.4	302.2	327.1	358.4	263.1	282.3	122.1	165.9	132.9	114.3	224.0	83.3	125.9
Carib													148.4
B. Buffel & C	124.0	121.3	386.4	281.5	220.3	163.7	199.4	103.7	106.0	55.5	116.5	132.5	113.3
B. Buffel													101.6
Pangola & C	86.9	53.4	421.0	147.6	378.4	140.8	111.6	35.7	80.1	22.5	88.1	44.0	45.3
Pangola													109.8
Gr. Panic & C	52.8	79.0	290.2	160.4	285.9	69.0	151.6	57.6	79.0	N.R.C.	78.4	6.7	51.6
Gr. Panic													11.3
Guinea & C	42.5	60.8	263.4	99.4	234.4	173.4	119.0	154.2	82.6	N.R.C.	159.2	34.5	129.00
Guinea													94.2

TABLE I (Cont'd)

June '69		August '69		September '69		December '69		January '70		Average/Cut.			
8th Cut.		9th Cut.		10th Cut.		11th Cut.		12th Cut.		TOTAL			
658.4	247.6	645.2	356.6	312.8	194.0	224.8	167.0	273.4	119.0	5981.7	3692.7	498.5	307.7
119.3	20.2	52.7	36.6	97.3	67.9	88.5	14.9	50.6	16.4	1554.8	738.9	129.6	61.6
16.5	46.3	115.0	61.5	96.4	145.9	102.5	57.7	66.5	41.6	1579.7	861.1	131.7	71.8
131.0	70.6	64.1	125.1	43.1	48.5	41.7	97.8	57.6	69.5	1447.3	1356.0	120.6	113.0
159.9	61.2	91.7	30.4	119.3	66.8	20.7	16.8	22.3	20.1	1743.4	696.4	145.3	58.0
228.5	137.6	180.4	365.9	195.7	243.6	86.9	143.5	69.8	120.4	2147.8	2465.8	179.0	205.5
187.0	98.4	150.1	225.6	82.7	127.6	60.4	121.6	42.5	165.5	1788.6	1698.5	149.1	141.5
125.5	57.9	101.0	152.4	127.2	165.0	N.R.C.	77.9	75.4	128.9	1640.5	1135.9	148.1	94.7
158.6	14.2	185.7	42.1	170.8	24.4	19.5	17.4	N.R.C.	14.9	1524.1	497.0	138.6	45.2
404.6	54.6	117.0	126.8	115.0	69.9	N.R.C.	120.5	N.R.C.	26.2	1666.7	1014.5	166.7	92.2

This trial was concluded with the last cut on 22nd January 1970. The major reason for termination was the poor stand of five out of ten grasses and the conviction that enough material has been gathered in this preliminary trial.

The figures presented in Table I indicate that Merker Grass, both by itself and in the mixture with Centro gave the best yield of total crude protein per unit dry weight. This grass is, however, more commonly used as a soiling grasses and may not serve as good measure against the pasture grasses used.

On observation of the averages presented in Table I it may be noted that some district grouping could be made of the ten grasses used in this trial with both sub-plots of Group I being almost identically placed. Using an arbitrary line of demarcation and omitting Merker grass, the groups of "grasses plus legume" sub-plots would look like below:-

GROUP I

Carib grass & Centro

Guinea grass & Centro

Biloela Buffel & Centro

Pangola grass & Centro

GROUP II

Nandi Setaria & Centro

Green Panic & Centro

GROUP III

Kazungulu Setaria & Centro

Creeping Guinea & Centro

Gatton Panic & Centro

A grouping of the "grass alone" sub-plots also appear below since the form of the grouping is different from that presented above:

GROUP I

Carib Grass

Biloela Buffel

Gatton Panic

GROUP II

Pangola Grass

Guinea grass

GROUP III

Kazungulu Setaria

Creeping Guinea

Nandi Setaria

Green Panic

There was a very consistent performance of the "grass plus Centro" sub-plots in relation to the "grass alone" sub-plots. All species except Carib grass performed better in the mixed sub-plot than when growing alone. This fact points overwhelmingly to the beneficial effect that was produced by Centro in this trial. In the case of Carib grass it would appear that artificial nitrogeneous fertilizer had a better effect on growth than did the planted legume.

FORAGE SORGHUM VARIETY - FERTILIZER TRIAL
1969

SUMMARY

Four forage sorghum hybrids (Dino, Astro, Pioneer 931 and Pioneer 988) were planted at three different locations in the country. Trials planted at Central Farm and Stann Creek gave very satisfactory performance during the dry season. The performance of the replication laid down at the Mountain Pineridge site was less outstanding but, nevertheless, quite instructive.

The results of this trial indicate that:-

- i) There is no response to and, therefore, no need of phosphate fertilizer at Central Farm for good forage sorghum growth
- ii) response will be obtained to phosphate fertilizer at Stann Creek Agstat and Mountain Pineridge to a level of at least 300 lbs triple superphosphate per acre
- iii) the average yield of Pioneer 988 was superior to all other three hybrids in all three sites.

INTRODUCTION AND OBJECTIVES

Trials were laid down in 1968 to observe the growth and response of different forage sorghum hybrids under varying levels of phosphate fertilizers. The ultimate objective of these research projects is still aim at obtaining information on the production of forage sorghums during the dry season.

The site at Mountain Pineridge was included in this year's trial because of the increased interest of foreign investors in the possibility of livestock farming in these or similar areas.

MATERIALS AND METHOD

1. Sites:- Central Farm, Agstat Stann Creek, Mountain Pineridge
2. Design of Experiment:- A split-plot design with 4 hybrids and 4 levels of phosphate
3. Fertilizer:-
 - i) Urea at 300 lbs/acre equivalent
 - ii) Triple Superphosphate (T.S.P.) at:-
 - a) 100 lbs/acre equivalent
 - b) 200 lbs/acre "
 - c) 300 lbs/acre "
 - iii) Muriate of Potash at 100 lbs/acre equivalent.
4. Hybrids:- Pioneer 931 Astro
Pioneer 988 Dino
5. Treatments (Effective):-

Pioneer 931	at 0, 100, 200, 300 lbs T.S.P./acre equivalent
Pioneer 988	at 0, 100, 200, 300 lbs/T.S.P./acre "
Astro	at 0, 100, 200, 300 lbs T.S.P./acre "
Dino	at 0, 100, 200, 300 lbs T.S.P./acre "

PRE-PLANTING

At Central Farm the site was ploughed, harrowed and rotovated being planted; only ploughing and harrowing were done to prepare the land at the Stann Creek Agstat. Because the shallow top soil of the Mountain Pineridge (M.P.R.) site the area was first bushhogged and raked then harrowed to a fine tilth.

PLANTING

The replication at M.P.R. was put down on 2nd January 1970 and fertilized on 8th January. The Central Farm replication was put down and fertilized on 5th January 1970; and at Stann Creek the trial was planted on 15th January. All rows were planted by hand at thirty inches apart.

RESULT AND DISCUSSIONS

GERMINATION

The germination of forage sorghum seeds was generally good at all three sites. At Central Farm germination varied between 80% and 95% and in the Pineridge replication between 90% and 100%. Only a few plots had germination performance below these figures. Observation of the replication at Stann Creek Agstat on 9th February bore evidence to a good germination and stand in all plots.

WEED INFESTATION

In the Central Farm replication there was need for weed control in two instances. The first was on 17th February when Gramoxone was applied between the rows with average height of sorghum at 20 inches. It is believed that this weed situation arose because of delayed germination of sorghum due to lack of rain. Actually, good germination was not received until approximately two weeks after planting. The Gramoxone applied at 70 c.c. per 3 gallons water was very effective. On the second occasion machete weeding was done immediately after the first harvest. There was no more need for weeding in this replication.

There was no need for weeding the replication at the M.P.R. site and no record of weeding done in the replication at the Stann Creek Agstat.

DISEASE & INSECT INFESTATION

Observation of the trial replication at Central Farm showed that at different times various types of insects were present in larger or smaller quantities. These insects included Diabrotica spp., armyworm, leaf-hoppers, aphids, and cut worms; mites were also present. The insect that presented by far the greatest problem, however, was the Diabrotica spp. against which spraying was done (quite successfully) with Dipterex on two separate occasions.

The only disease organism found on forage sorghum plants at Central Farm was the fungus Helminthosporium spp. This attack was noted to be more intense on the two Pioneer hybrids with Dino (an Astro Hybrid) being completely free of attack. No control measures were taken.

The only insecticide used in the M.P.R. replication was Aldrin (40% W.P) which was applied at planting against soil-borne insects. Some aphids and armyworms were observed in this replication but there was no need for control measures to be taken.

Cutting & Tillering

A total of four cuts were obtained from the replicate at Central Farm, three from that at Stann Creek Agstat and only two from

that at M.P.R. The following tables show the Data on cutting frequency at the different sites:-

CUTTING DATA (CENTRAL FARM)

<u>Date</u>	<u>No. of Cut</u>	<u>Days Regrowth (Growth)</u>
6.3.70	First	39
8.4.70	Second	32
20.5.70	Third	41
23.6.70	Fourth	33

CUTTING DATA (STANN CREEK)

<u>DATE</u>	<u>No. of Cuts</u>	<u>Days Regrowth (Growth)</u>
13.3.70	First	46
6.5.70	Second	53
2.7.70	Third	56

CUTTING DATA (M.P.R.)

<u>DATE</u>	<u>No. of Cuts</u>	<u>Days Regrowth (Growth)</u>
13.3.70	First	63
8.5.70	Second	55

Observation of the following of all four hybrids indicate the hybrid Astro has shorter growth period than the two Pioneer hybrids 931 and 988. This was noted at Central Farm when on three separate occasions of cutting, the Astro hybrid had 95 - 100% following but was shorter than the 988 and 931 which only averaged approximately 50% flowering.

At Stann Creek it was noted that a time of cutting average height of stock was generally greater in Astro and Pioneer 931. Since no record of flowering was taken it can only be assumed that plants were cut at maximum flowering, therefore indicating a faster rate of growth for Astro and Pioneer 931 under conditions at the Stann Creek Agstat. Because of the uneven type of growth and growth response in the replication at M.P.R. no definite height difference were noted at this site.

Below are given the total yields of green chop forage calculated in tons per acre for the different replications.

T A B L E II

Yield of Green Chop Forage (Tons/Acre) (Central Farm Replication)

<u>Whole Plot</u>	<u>Phosphate Level</u> <u>Split Plot</u>	<u>Block I</u>	<u>Block II</u>	<u>Block III</u>
Pioneer 931	0	41.5	36.3	47.0
	1	47.6	46.0	48.1
	2	44.9	46.8	33.4
	3	50.4	44.2	35.8
<u>TOTAL</u>		<u>184.4</u>	<u>173.3</u>	<u>164.3</u>

(Cont'd) TABLE II

Pioneer 988	Phosphate Level			
	Split Plot	Block I	Block II	Block III
	0	53.4	58.7	49.9
	1	53.4	32.9	49.9
	2	44.3	58.0	47.9
	3	52.7	53.6	50.0
TOTAL		203.8	203.2	197.7
Astro	0	40.3	49.4	35.4
	1	46.3	48.7	48.7
	2	44.8	56.6	47.7
	3	41.3	49.0	40.2
	TOTAL	172.7	203.7	172.0
Dino	0	24.9	31.7	34.9
	1	29.0	34.9	27.9
	2	27.2	31.3	29.7
	3	31.5	45.8	32.4
	TOTAL	112.6	143.7	124.9

TABLE III

Yield of Green Chop Forage (tons/acre)
(STANN CREED AGSTAT REF.)

Whole Plot	Phosphate Level Split Plot	Block I	Block II	Block III
Pioneer 931	0	4.8	0.5	3.3
	1	12.2	2.6	3.3
	2	5.4	6.3	14.8
	3	9.6	6.6	12.1
TOTAL		32.0	16.0	33.5
Pioneer 988	0	5.2	0.4	2.1
	1	8.2	6.8	9.1
	2	12.9	1.8	13.1
	3	6.0	6.3	12.1
TOTAL		32.3	15.3	36.4
Astro	0	10.7	2.3	5.1
	1	2.1	3.1	9.1
	2	3.8	11.3	5.0
	3	5.6	6.0	11.4
TOTAL		22.2	22.7	30.6
Dino	0	9.9	2.3	4.2
	1	6.5	4.9	7.8
	2	4.0	5.2	7.1
	3	3.4	9.7	14.1
TOTAL		23.8	22.1	33.2

TABLE IV

Yield of Green Chop Forage (tons/acre)

(M.P.R. Rep.)

Whole Plot	Phosphate Level Split Plot	Block I	Block II	Block III
Pioneer 931	0	--	--	--
	1	0.4	0.5	0.2
	2	1.3	0.3	1.4
	3	1.1	0.5	2.1
TOTAL		2.8	1.3	3.7
Pioneer 988	0	--	--	--
	1	0.9	0.3	0.4
	2	0.8	0.9	1.2
	3	1.4	0.6	2.2
TOTAL		2.1	1.8	3.8
Astro	0	--	--	--
	1	1.1	0.2	0.2
	2	1.0	0.5	0.7
	3	0.3	1.1	1.1
TOTAL		2.4	1.8	2.0
Dino	0	--	--	--
	1	0.2	--	0.3
	2	0.7	0.6	0.6
	3	1.6	1.1	1.1
TOTAL				

TABLE V

Average Yield of Green Chop Forage (tons/acre)
(Central Farm Replication)

<u>Pioneer 931</u>	<u>Pioneer 988</u>	<u>Astro</u>	<u>Dino</u>
43.5	50.4	45.7	31.8
<u>0 lb/acre T.S.P.</u>	<u>100 lbs/acre T.S.P.</u>	<u>200lbs/ac TSP</u>	<u>300lbs/ac TSP</u>
42.0	42.8	42.7	43.9

TABLE VI

Average Yield of Green Chop Forage (tons/acre)
(Stann Creek Agstat Rep.)

<u>Pioneer 931</u>	<u>Pioneer 988</u>	<u>Astro</u>	<u>Dino</u>
6.8	7.1	6.3	6.6
<u>0 lbs/ac T.S.P</u>	<u>100 lbs/ac T.S.P.</u>	<u>200 lbs/ac TSP</u>	<u>300 lbs/ac TSP</u>
4.2	6.3	7.6	8.6

TABLE VII

Average Yield of Green Forage (tons/acre-)
(M.P.R. Replication)

<u>Pioneer 931</u>	<u>Pioneer 988</u>	<u>Astro</u>	<u>Dino</u>
0.9	1.0	0.7	0.7
<u>0 lb/ac T.S.P.</u>	<u>100 lbs/ac T.S.P.</u>	<u>200 lbs/ac TSP</u>	<u>300 lbs/ac TSP</u>
--	0.4	0.8	1.2

CONCLUSION

An overall observation of the yield of green chop forage indicates that the results obtained from cutting sorghum at Central Farm far exceeded the results obtained from either Stann Creek or Mountain Pineridge. This is undoubtedly influenced to a large extent by inherent soil fertility status of the three soils.

The response to phosphate was quite negligible at Central Farm whereas there is an almost linear response in Stann Creek and a response in arithmetical progression at the site in the Mountain Pineridge. This shows that there is definite response to phosphate at Stann Creek Agstat and Mountain Pineridge.

As far as the different hybrids are concerned reference to the above Tables show that Pioneer 988 still shows its dominance in terms of yield of forage over Pioneer 931 and the newly introduced Astro and Dino. This hybrid definitely is superior material but its use on a wider and more commercial scale would be hindered by the high price that has to be paid in transshipment.

Because of the difficulty of assessing all sorghum hybrids produced by all seed firms it is considered that we should only obtain the best from each firm according to their own advice.

EXPERIMENTAL REPORT - GRASS SPECIES & FREQUENCY OF CUTTING TRIAL

INTRODUCTION & OBJECTIVE

A preliminary progress report was made on this trial in the Annual Report 1969. At that time treatments and objectives were noted and results reported up to 18th December 1969 for the 4 and 8 weekly cuttings and to 20th November 1969 for the 6 weekly cuttings. The first cut recorded is for the 28th August 1969.

The last cut for this trial was made on 30th July 1970. This trial was concluded at this point because of the uneven performance of grasses in the different blocks, wide variation in yield among the different species and the scarcity of stand.

SUMMARY

The results of this trial indicate that improved grasses can be grown in the soils that are common in the Mountain Pineridges and similar areas but that growth will be less luxuriant under similar fertilizer treatment as used on alluvial and valley - bottom soils.

From figures obtained over approximately one year, it would appear that:-

- i) the six - weekly interval of cutting appears to be well suited for grasses in the Mountain Pineridge.
- ii) Merker will give its best total yield when cut at 4-weekly intervals.
- iii) Coloniao Guinea grass gave the overall best performance in view of its combined total and average yield of fresh material.
- iv) planting just before the dry could very well prove disastrous to a satisfactory germination or strike of grass.

MATERIAL AND METHODS

1. Site:- Mountain Pineridge
2. Design of Experiment:- Completely randomized block with split plot and three replications.

3. Treatments:-

a) Plots - Species

Star grass	Rhodes grass
Coastal Bermuda grass	Merker grass
Molopo Buffel grass	Creeping Guinea
Coloniao Guinea grass	Dallis grass

b) Sub - plots - Frequency of cutting

4 weeks interval
6 weeks interval
8 weeks interval

4. Plot Size:-

Each plot measured 10' x 30'

Each sub-plot measured 10' x 10'

5. There were 1-foot guards between plots and also between sub-plots.

6. Pre-planting Cultivation

Because of the presence of only a thin top soil, the experimental area was not ploughed but was rather harrowed and cross-harrowed several times until a medium tilth was obtained. The dry grass was raked off the planting site after preparation.

7. Planting

This trial was planted in November 1968. All eight species were planted by different methods and Urea and triple super-phosphate applied at 5.5 oz and 7.5 oz respectively per sub-plot. The methods used for planting the different grasses are as shown below:-

Star grass	- stem cutting
Coastal Eermuda	- stem cuttings
Merker grass	- stem cuttings
Creeping Guinea	- stem cuttings
Coloniao Guinea	- root setts
Rhodes grass	- root setts
Dallis grass	- root setts
Molopo buffel	-, seeds

RESULTS AND DISCUSSION

Germination and/or strike

Even at the early period there was considerable difficulty in obtaining an adequate stand of any of the species. Replanting had to be done several times for Dallis grass, Molopo Buffel, Coastal Bermuda and Coloniao Guinea. In May approximately six months after planting, the grasses were in general ready for clipping but adequate coverage was still not obtained from some. The fact that the establishment period of the grasses planted in this trial included the entire dry season may have accounted for the difficulty in obtaining a good strike. Also because of the dry season some watering had to be done to encourage growth.

WEED INFESTATION

The most troublesome weed in this trial was the broadleaf Emilea coccinea which in all likelihood was introduced from Central Farm. This along with the few Pineridge "wire grasses" were controlled by hand weeding. Pangola grass which had been planted in the walk-ways to discourage weeds became a threat to the adjacent plots and had to be kept in regular check to prevent invasion.

INSECT & DISEASE INFESTATION

A "no-spraying" policy was adopted for this trial to allow the environment to have a stronger influence on growth than is normally allowed in trials. Insect attacks were quite numerous and at times some severe damage was experienced. The reason for these attacks has been suggested to be the succulence and high nutritive status of these improved grasses as compared to the natural vegetation in the Pineridge. Insects included leaf-hoppers, frog-hoppers, Coccileae, aphids, scale insects, and ants. A combination of ants and scale insects caused the death of Dallis grass in all three blocks of this trial.

Only two fungal diseases were found in this trial, these being Helmithosporium and the rust.

HARVESTING

There was never really any adequate establishment of either Rhodes grass, Molopo Buffel or Dallis grass. The first was planted a second time from seeds which germinated poorly and did not give an adequate density. The second was planted again from root setts and stem cuttings but no strike was obtained. No more planting of Dallis grass was done after the scale insect infestation as no planting material was available.

As a result of this the figures that are shown below can only be compared for the first five species as listed in the table, these being:- Creeping Guinea, Merker grass, Coloniao Guinea, Coastal Bermuda and Star grass.

The table shows that the highest overall yields over all cuttings was given by Merker Grass at 4 - weekly cutting intervals and Coloniao Guinea grass at 6-weekly cutting intervals. In view of the fact that the Coloniao Guinea also gave the best average yield per cut it would appear that this grass would give better results under grazing. Also, the results of frequent cutting during the dry season (e.g. Merker at 4-weekly intervals) would tend to deplete the reserves of the grass, and so cause an early loss in grass density.

GRASS SPECIES & FREQUENCY CUTTINGS

TOTAL FRESH WEIGHT YIELD (Ounces)

Sp & Freq.	Block I	Block II	Block III	TOTAL	Absolute Average per cut.
Creeping 4	363 ¹¹	404 ¹¹	363 ¹⁰	1130	35.3
6	807 ⁸	554 ⁸	783 ⁸	2144	89.3
8	320 ⁵	944 ⁶	357 ⁵	1621	101.3
Merker 4	1800 ¹²	957 ¹²	921 ¹¹	3678	105.9
6	1446 ⁸	747 ⁸	643 ⁷	2836	123.3
8	912 ⁶	974 ⁶	946 ⁵	2832	166.6
Coloniao 4	1134 ¹²	989 ¹²	784 ¹²	2907	80.8
6	1902 ⁸	1069 ⁸	517 ⁷	3488	151.7
8	1545 ⁶	798 ⁶	659 ⁶	3002	166.8
Star 4	752 ¹²	227 ⁴	315 ⁶	1294	58.8
6	864 ⁸	357 ⁵	542 ⁵	1763	97.9
8	867 ⁶	156 ⁴	303 ⁴	1326	94.7
Rhodes 4	68 ⁴	206 ⁷	--	274	24.9
6	32 ¹	120 ³	--	152	38.0
8	1 ¹	106 ⁴	--	107	21.4
Molopa 4	186 ⁵	38 ⁵	--	224	22.4
6	154 ⁷	56 ³	2 ¹	212	19.3
8	157 ⁶	50 ⁴	12 ²	219	18.3

* Indices indicate the total number of cuts obtained over the entire trial period.

The overall performance of the Coloniao Guinea grass was good throughout the trial at all cutting - intervals and so warrants attention. This attention is especially called for in view of the fact that, unlike Merker, this grass can be subjected to a regular grazing programme or rotation.

The performance of Coastal Bermuda and Star grasses has been less spectacular but, nevertheless, consistent with the general trend of giving best results from their 6-weekly cutting intervals.

CONCLUSION

This trial was designed for a fertilizer application of 562 lbs. actual nitrogen and 736 lbs. phosphorous pentoxide per acre. It is believed that higher yields could have been obtained from higher fertilizer regimes. However it may be, it may be considered that Merker grass and Coloniao Guinea should be considered as possible parts of a programme for producing forage for livestock in this region.

Progress Report on Pangola Fertilizer Trial (Pineridge)

As reported in the 1969 Annual Report of this section, this trial was replanted in August 1969 and fertilized with Urea and Triple superphosphate.

The period of establishment of this grass extended through the "dry season" of 1970 and as such growth was slow and spreading of stolons restricted. There was evidence of nitrogen and phosphate deficiency during the period and the appearance of the grass did not improve until in late May after some rain had been received.

The trial was cut, weighed and sampled for the first time on 4th June 1970 and was subsequently cut three more times in 1970. Some supplying of plots with scanty growth was done in August and weeding had to be done on several occasions particularly to control the broadleaf, Emilea coccinea. Visual symptoms of phosphate deficiency occurred in the N₁ plots in August and September but eventually disappeared before the cutting in September. The fungus, (Piricularia grisea, was observed in this trial on 26th October and grass - hoppers on 2nd November.)

Below are given the fertilizer treatments and the results of the four cuts which were done in 1970. So far according to average fresh weights yield per plot the best results are being obtained from the higher fertilizer regimes - namely, N₃ P₂ K₂, N₂ P₂ K₂ and N₂ P₂ K₁ in order of magnitude.

The fertilizer treatment combinations are as follows:-

Control (N ₁)	N ₃ P ₂ K ₁	N ₁ P ₂ K ₂
N ₂	N ₃ P ₂ K ₂	N ₂ P ₀ K ₁
N ₃ P ₁ K ₀	N ₁ P ₀ K ₁	N ₂ P ₀ K ₂
N ₃ P ₀ K ₁	N ₁ P ₀ K ₂	N ₂ P ₁ K ₀
N ₃	N ₁ P ₁ K ₀	N ₂ P ₁ K ₁
N ₃ P ₂ K ₀	N ₁ P ₁ K ₁	N ₂ P ₁ K ₂
N ₃ P ₀ K ₂	N ₁ P ₁ K ₂	N ₂ P ₂ K ₀

N₃ P₁ K₁

N₁ P₂ K₀

N₂ P₂ K₁

N₃ P₁ K₂

N₁ P₂ K₁

N₂ P₂ K₂

N₁ - 700 lb. Urea/ac./an. - 100 lb/ac/cutting at 7 cuts / annum

N₂ - 1400 lb. Urea/ac/am - 200 lb/ac/cutting at 7 cuts / annum

N₃ - 2100 lb. Urea/ac/an. - 300 lb/ac/cutting at 7 cuts / annum

P₁ - 100 lb. TSP/ac/an - 50 lb/ac applied twice per year

P₂ - 200 lb TSP/ac./an - 100 lb/ac. applied twice per year

K₁ - 100 lb Kcl/ac./an - 50 lb/ac. applied twice per year

K₂ - 200 lb Kcl/ac./an - 100 lb/ac. applied twice per year

K₀ - No potash applied

P₀ - No phosphate applied

Pangola Fertilizer Trial - (Pineridge)

Yield of Fresh Weight (lb.) from Four Harvests

Treatments	Block I	Block II	Block III	Block IV	Total	Average
N ₁	18.0	18.5	10.0	15.5	62.0	15.5
N ₂	13.0	17.0	11.5	17.5	59.0	14.7
N ₃	24.0	11.5	13.5	22.5	71.5	17.8
N ₁ P ₁	25.5	20.5	15.5	25.5	87.0	21.7
N ₁ P ₂	14.0	22.0	21.5	26.0	83.5	20.8
N ₂ P ₁	17.0	20.5	20.0	18.0	75.5	18.8
N ₂ P ₂	26.0	35.0	29.5	17.5	108.0	27.0
N ₃ P ₁	19.5	38.0	33.5	17.0	108.0	27.0
N ₃ P ₂	16.5	39.0	29.0	27.5	112.0	28.0
N ₁ K ₁	15.5	11.0	10.0	8.0	44.5	11.1
N ₁ K ₂	8.0	25.0	18.0	20.0	53.0	13.2
N ₂ K ₁	12.5	18.5	17.0	18.5	66.5	16.6
N ₂ K ₂	10.5	19.0	10.5	13.5	53.5	13.3
N ₃ K ₁	6.0	15.0	17.5	8.0	46.5	11.8
N ₃ K ₂	21.5	22.5	13.5	20.0	77.5	19.3
N ₁ P ₁ K ₁	20.0	32.0	23.0	21.0	96.0	24.0
N ₂ P ₁ K ₁	28.5	27.5	22.5	27.0	104.5	26.1
N ₃ P ₁ K ₁	19.5	39.0	28.0	33.5	110.0	27.5
N ₁ P ₂ K ₁	18.5	37.5	30.0	24.0	118.0	29.5
N ₂ P ₂ K ₁	21.0	50.5	43.5	35.5	140.5	35.1
N ₃ P ₂ K ₁	35.0	25.5	18.5	38.5	117.5	26.3
N ₁ P ₁ K ₂	16.0	24.5	23.5	15.0	79.0	16.7
N ₂ P ₁ K ₂	39.5	29.5	27.5	44.0	140.5	35.1
N ₃ P ₁ K ₂	35.0	31.5	15.5	41.5	123.5	30.8
N ₂ P ₂ K ₂	41.5	28.5	33.0	43.0	146.0	36.5
N ₃ P ₂ K ₂	46.0	44.5	31.5	59.0	181.0	45.2
N ₁ P ₂ K ₂	41.5	34.0	23.0	33.0	131.5	32.8

Arable - Ley Rotation Trial - Ref. AP806

Introduction

This project which considers the subjects of farm management and utilization of resources commenced in October 1966 and is being conducted on a section of land measuring 14.49 acres.

This year the land was divided into 6.84 acres for pasture and approximately 4.5 acres for the planting of corn and R.K. Beans. On 19th. February 1970 seven steers, ranging in weight from 469 lb. to 594 lb. and averaging in weight 613 lb. were introduced to the trial and were still on pasture at the end of the year.

One crop each of corn and beans was harvested this year with an average of 2,000 lb. and 400 lb. per acre respectively.

Procedure

This section is divided into six paddocks ranging from 2.14 acres to 2.90 acres. Three of these paddocks are used to grow pasture grasses and three for agronomic crops. Animals are rotated through the paddocks; and it is intended to establish grass in Blocks 4 and 5 in 1971 as part of a rotation for more efficient land utilization. Costings have been taken on all report of the profit accruing to a farmer under such an operation are reported in the appendix.

C R O P S

Corn (Zea Mays)

The hybrid corn Poey, T-66 was planted in Blocks 4 and 5 on 4.30 acres after the area was ploughed and harrowed. Planting was done on July on three separate days; Block 4 was only partially planted by machine and had to be completed by hand. Good germination was obtained and a good stand of corn emerged. Approximately one month after planting the area was sprayed with Atrazine at 4 lb/acre for the control of weeds. Spraying was not successful, however, and mechanical cultivation was done a week later. Weeds were controlled excellently by this operation, leaving a relatively clean field until time of harvest.

A yield of two thousand pounds per acre was obtained with the application of 150 lb. 10:30:10 fertilizer. Costings on this crop showed that a profit of one hundred sixty seven dollars and sixty cents was obtained from 4.30 acres.

Red Kidney Beans (Phaseolus vulgaris)

Approximately seven acres of Red Kidney Beans were planted for the 1969 - 70 crop, actuals planting being carried out in December, 1969. The entire area was ploughed in November but incessant rain hampered further preparation until December when harrowing and planting was done. Very poor germination was obtained from Blocks 4 and 5, probably because of a lack of water. Block 1, on the other hand, is a low-lying area which retains more moisture, and good germination of bean seeds was obtained in this area. Subsequent weather conditions were unfavourable for growth in this block, however, and a good deal of damage was suffered from heavy rains in January. Many of the plants in the lower areas suffered from root rot and did not, in consequence, mature.

The yield obtained this year was, in expectation as in fact, very low. The poor plant stand and the damage in Block 1 accounted for this. A total yield of 3.015 lb. was obtained from the application of 50 lb. 10: 40: 10 fertilizer. Costings taken on this project indicated that a profit of one hundred seventy eight dollars and twenty five cents could have been made from the entire operation.

Cattle Rotation

The operation of the cattle project in this trial has been made to simulate a fattening scheme whereby steers would be bought a little past weaning and fattened to approximate an average of 1,000 lbs. per batch. A group of seven steers were obtained from the livestock section on 19th February, 1970. These steers have been rotated through three paddocks consisting of Pangola grass (Hyparrhenia rufa). A table is presented below to show the weight gain over the period spent in this trial.

T A B L E VIII
Weight of Cross Bfeed Steers
(pounds)

Brand	February	December	Gain in 302 days	Gain/Day	V A L U E
8/48	548	839	291	0.96	96.03
8/128	469	922	453	1.17	149.49
8/83	667	1055	388	1.28	128.04
8/132	694	1060	366	1.21	120.78
8/52	599	1021	422	1.40	139.26
8/32	683	980	297	0.98	98.01
8/56	634	1015	381	1.26	125.73
TOTAL	4294	6892	2598		857.34

* Value is taken at \$0.33 per lb. liveweight.

Apart from the gross profit made from weight - gain over the 302 days there was also a profit realized on the original weights of the steers in February. This profit is based on the fact that the quality of the steers was improved such that a total of \$0.08 more could be obtained on the original 4,294 lbs than would have been possible in February.

Total value, therefore, is \$857.34 + \$857.52 = \$1,192.86

It is worthy to mention here that there was poor regrowth of Jaragua grass in Block 6 starting from August to the end of the year. This situation caused very poor or indifferent animal performance when this block was grazed. On the basis of its performance over a long period of the year Jaragua grass is not recommended for inclusion in any intensive rotation system.

A total profit of one thousand three hundred and seventy four dollars and sixty cents (\$1374.60) was made in 1970 from the pastures and arable crops planted. The profit from the steers is very interesting and could well be the basis for producing grass-fattened steers. The yield of beans could have been better if the germination and weather conditions were more favourable.

A P P E N D I X

Costings On Arable - Ley Rotation Trial

	C R E D I T		D E B I T	
Livestock : Rotation - February to December	\$	£	\$	£
Sale of Cattle	1192	86		
Cost of fertilizer			85	-
Cost of applying fertilizer			20	-
Cost of bushhoging			40	-
Cost of drenching			7	-
Cost of spraying			3	50
Cost of minerals			8	61
P R O F I T F O R T H E Y E A R	1028	75	164	11
C R O P S - C O R N				
Sale of corn	361	20		
Cost of fertilizer			48	-
Cost of applying fertilizer			8	-
Cost of ploughing and harrowing			60	-
Cost of cultivation			12	80
Cost of corn seed			20	-
Cost of planting			12	80
Cost of harvesting			32	00
P R O F I T F O R T H E Y E A R	167	60	193	60
R. K. B E A N S				
Sale of Beans	603	00		
Cost of Seed			48	-
Cost of Fertilizer			105	-
Cost of ploughing and harrowing			60	-
Cost of Cultivating			33	75
Cost of planting			20	00
Cost of applying fertilizer			8	00
Cost of Harvesting			150	00
P R O F I T F O R T H E Y E A R	178	25	424	75

D. Animal Health

An outbreak of rabies was detected by the Veterinary Officer early in the year and immediate recommendations were made to control the outbreak. In the event the outbreak spread to most parts of the country involving dogs, cattle and two humans.

Extensive efforts were made to detect a wildlife vector, without any success. At Willows Bank in the Belize District, where cases occurred in cattle, no history of a suspect dog can be obtained, but again all efforts failed to incriminate wildlife, and the rapid recession of the disease without recurrence does not suggest an established reservoir in wildlife vectors.

During the latter part of the year, extensive outbreaks of distemper occurred in dogs, principally in Belize City. An outbreak of swine fever also occurred in the Northern districts.

Besides these outbreaks, there were no other serious animal health problems. The Department continued to supply veterinary drugs and services to farmers at subsidized rates, and to treat animals as required. Lists of clinical cases treated, Laboratory examinations, and Diseases found at meat inspection can be obtained from Appendices VIII, IX, and X respectively.

E. ANIMAL HUSBANDRY:-

The Department maintained herds of cattle, pigs, and sheep at Central Farm and on district agricultural stations. Various breeds are being evaluated with the view in mind that these herds should serve as foundation stock for the national livestock industry. From these herds, farmers are supplied with good breeding animals with which they can gradually upgrade their local (Creole) animals.

F. AGRICULTURAL EDUCATION:-

(1) Central Farm Agricultural School:-

At Central Farm courses were held for farmers, extension staff, mechanics, clerical staff and Survey technicians.

Seventy Two (72) farmers from all districts, except Toledo, attended seven courses in livestock and crop husbandries. Transport and weather conditions prevented Toledo farmers from participating.

Eleven extension officers attended a course in soil and leaf sampling. Due to staff shortages and crop and livestock surveys no other extension officers were released from their district duties, therefore no more courses were held.

Twenty-six mechanics of the Agriculture Department and the private sector attended two courses given by the Massey-Ferguson Company.

Twenty-five staff members took a five day course in finance and stores. Members of the Audit, Accountancy, Finance and Stores sections of the Government lectured.

The Survey Department conducted a course for technicians and Agriculture Department personnel.

Courses in bee-keeping and corn storage were held in the Northern Districts for farmers and extension staff.

Much interest was shown in the corn storage and pig management courses.

(2) Extension Publications:-

During the year the following publications were put out and circulated among farmers:-

Leaflet No. 1 - Collecting and storing Grass Seed
Bulletin No. 1 - Caracteristicos Deseables de los Cerdos
Bulletin No. 2 - Yam in Belize
Bull No. 3 - Recommendations for Corn Production
Leaflet No. 2 - Hunger signs in corn
(English and Spanish Editions)
Bulletin No. 4 - Corn as a Livestock Feed
Bulletin No. 5 - Agricultural Supplies.

(3) Radio Talks - "Farming For Progress"

The weekly 40 to 50 minute programme "Farming for Progress" was broadcast on Sundays at 2:15 p.m. Monthly features were:-

January - Honey Industry 1969
Landscaping with ornamental plants
Pig Management

February - Pig Management
Agricultural activities 1969, Cayo and Corozal

March - Agricultural activities 1969, Belize, Stann Creek, Toledo

April - Livestock Breeding
Grow More Corn Campaign - 1 week

May - Farm Planning on Small Farmers Cannibalism in Poultry

June - Bee Keeping
Army worm in corn

July - Poultry Rearing
Diseases in corn, Plant protection Horticultural Nursey, Central Farm

August - Rice Production
Corn storage
Farm mechanization

September - Citrus diseases
Onions and Irish potato growing

October - Poultry diseases

November - Poultry diseases
National Agricultural Show

December - National Agricultural Show

(4) National Agricultural Show:-

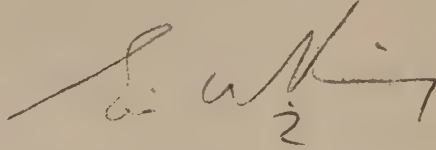
A highly successful National Agricultural Show was held at the Showgrounds in Belmopan on November 14th and 15th. The emphasis was on educational aspects, and farmers from all over the country competed with a wide variety of crops and livestock exhibits. In addition, many commercial firms whose operations are ancillary to agriculture displayed their products at the show.

(5) Extension Visits, Meetings, etc.

Extension staff in the districts continued to advise farmers with regards to improving their techniques in crop and livestock production. The lack of adequately trained staff, however, severely limits the impact which any extension programme can produce.

ACKNOWLEDGEMENTS

Continued help and co-operation has been received from official bodies, other Government departments, and private individuals. This help is greatly appreciated.

A handwritten signature in dark ink, appearing to read 'E. W. King'. The signature is fluid and cursive, with a large 'K' and a long horizontal stroke at the end.

(E.W. KING)
Chief Agricultural Officer
M/Agric., Lands & Coops.

A PPENDIX I

RAINFALL RETURNS 1970

DISTRICT AND STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL 1970	TOTAL 1969	10 Yrs. Av.
<u>COROZAL</u>															
COROZAL AGSTAT	1.19	4.16	NIL	NIL	6.21	11.33	8.79	NA	7.43	9.85	1.51	1.51	NA	64.06	NA
B.S.I LIBERTAD	1.30												NA	60.72	NA
<u>ORANGE WALK</u>															
HILL BANK	2.06	1.85	0.21	NIL	3.46	10.14	12.99	7.41	5.70	6.77	1.74	4.88	57.21	75.35	NS
YO CREEK	1.34	2.36	0.79	NIL	5.43	4.46	7.20	6.39	8.04	9.41	1.06	3.17	49.65	68.40	NS
<u>BELIZE</u>															
Landivar	4.30	1.78	2.33	0.08	3.38	0.96	7.02	5.20	7.64	8.35	3.53	8.34	60.91	76.05	NA
Bze. International Airport	2.98	1.45	1.68	0.04	5.41	14.01	4.59	8.18	10.41	8.40	4.58	7.33	69.06	83.03	74.52
Gracie Rock	2.22	2.52	1.05	NIL	4.32	18.53	10.05	9.83	5.65	7.79	4.17	6.98	73.11	84.19	68.13
Maskall	0.96	1.80	NIL	NIL	6.03	12.20	4.19	7.86	10.53	4.39	2.36	4.12	54.44	72.54	71.28
Big Falls	2.57	3.09	1.17	0.04	6.01	12.64	16.13	10.59	6.23	11.27	1.94	7.76	79.44	84.19	NS
Ambergris Caye	5.61	4.24	0.18	NIL	4.79	5.11	4.10	4.37	6.17	6.18	9.26	2.97	52.98	68.64	NA
Rancho Dolores	2.12	2.96	0.63	NIL	2.93	11.47	13.50	11.65	6.79	11.40	3.82	7.12	74.41	NA	NS
Bermudian Landing	2.98	4.68	1.50	NIL	4.59	11.81	11.80	6.57	5.42	7.26	1.61	6.01	64.23	67.08	NS
Freetown Sibun	4.31	2.68	0.69	NIL	6.00	19.52	4.20	11.61	5.99	7.93	4.48	6.06	73.47	69.89	NS
Churchyard	4.42	3.98	1.57	0.06	4.43	15.81	18.97	12.37	9.72	12.19	4.45	5.82	93.79	102.91	NS
<u>CAYO</u>															
San Ignacio	3.65	2.00	1.08	NIL	2.90	3.35	11.03	5.82	6.66	5.35	5.88	6.51	54.23	66.38	NA
Benque Viejo	2.88	1.66	0.53	0.22	2.37	5.03	8.72	4.70	7.26	6.76	8.36	5.61	54.10	62.53	NA
Central Farm	2.90	2.36	0.85	NIL	3.11	6.58	4.95	6.81	7.57	4.13	4.25	7.81	51.32	65.73	56.02
Norland	4.25	2.19	0.84	0.02	3.96	6.33	9.90	7.13	7.45	5.11	5.73	8.00	60.91	70.68	59.94
Belmopan	5.94	6.35	1.21	0.10	6.11	9.52	19.72	14.16	9.61	7.83	3.59	9.70	93.84	94.73	NS
Augustine	5.20	2.55	0.44	0.22	2.78	3.37	8.17	7.61	8.71	9.01	10.47	5.49	64.03	76.76	61.47
Cooma Cairn	9.05	6.84	1.27	0.09	2.03	2.20	9.86	9.02	7.24	10.65	13.95	7.41	79.62	102.65	81.37
Sibun Hill	25.65	7.68	2.71	0.04	9.24	6.24	7.65	13.43	8.23	7.31	11.13	10.47	110.08	163.73	107.05
Spanish Lookout	3.72	3.44	0.62	NIL	4.30	5.49	8.35	7.99	7.04	4.83	3.52	9.26	58.56	74.30	NS
Humming Bird Sibun	9.01	5.65	1.71	NIL	2.75	14.69	21.36	16.20	7.29	8.61	7.37	13.44	108.08	118.88	NS

DISTRICT AND STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL 1970	TOTAL 1969	10 Yrs. Av.
<u>STANN CREEK</u>															
S tann Creek Agstat	5.52	3.82	0.98	0.05	4.49	8.91	11.16	16.15	7.80	7.20	5.81	8.38	80.37	97.91	84.95
Alta Vista	7.35	NA	1.23	0.03	2.37	13.18	17.30	20.31	13.90	12.05	6.25	11.80	NA		NA
Pomona	6.57	3.49	1.49	0.28	4.62	11.89	15.72	18.02	12.15	9.44	6.53	11.37	101.57	103.30	94.68
Melinda Farm	6.09	4.00	0.42	Nil	2.61	8.92	7.80	14.55	5.32	6.69	3.57	12.25	72.22		NA
Savannah	9.53	3.85	0.84	0.05	1.84	NA	20.98	15.29	10.60	13.62	NA	NA	NA	101.84	NA
Melinda Forest St.	5.04	3.27	0.80	0.10	4.44	NA	10.60	18.51	7.49	6.99	NA	11.35	NA	96.59	NS
Middlesex	10.05	3.56	1.98	0.40	4.68	12.45	24.07	20.89	7.43	8.07	5.94	14.83	114.35	121.37	110.51
<u>TOLEDO</u>															
Punta Gorda Agstat.	10.32	2.51	0.87	0.28	3.74	13.13	28.07	25.36	27.42	14.45	2.57	9.49	138.11	159.27	142.11
San Antonio.	5.40	3.06	3.13	Nil	4.60	NA	24.02	18.25	NA	NA	NA	NA	NA	122.90	NA
Machaca	20.62	17.68	15.44	0.12	4.75	13.71	28.59	31.76	29.00	14.50	3.95	4.80	184.92	123.44	133.31

Meteorological Data 1970

MONTH	Belize Int'l Airport	St. John's College, Land	Yo Creek Agstat	Ambergris Cave	Cabbage Haul	Melinda Forest Station	Central Farm	Augustine Pineridge	Cooma Cairn	Sibau Hill	Savannah Station	Stann Creek Agstat	Big Falls Ranch	Punta Gorda Agstat
January	-	82	71	84	81	85	81	81	71	70	82	81	75	87
February	-	88	78	83	78	84	78	80	69	67	82	80	73	83
March	-	85	84	86	86	88	86	88	78	79	93	85	78	89
April	-	89	84	89	73	92	73	94	83	83	97	88	87	94
May	89	88	85	89	91	93	91	92	82	82	94	89	87	92
June	88	87	82	88	88	-	88	89	80	78	-	88	36	87
July	87	88	83	85	89	91	89	87	79	77	91	88	87	89
August	88	88	86	88	87	93	87	88	80	81	93	88	87	90
September	87	88	81	87	87	91	87	86	78	78	89	87	87	90
October	86	86	86	88	88	91	88	85	77	75	90	86	83	90
November	81	81	76	86	80	-	80	78	70	72	-	82	79	91
December	82	82	79	87	81	87	81	81	70	75	82	82	78	89

	MR	68	64	69	62	61	60	57	56	57	58	55
January	69	67	66	73	76	80	79	78	78	74	69	70
February	64	63	64	72	73	73	73	70	72	70	64	65
March	66	65	72	72	71	-	75	74	74	73	-	70
April	62	60	60	67	68	67	68	66	68	67	62	61
May	58	58	63	67	65	67	66	67	66	66	59	62
June	62	60	65	68	67	72	69	65	68	67	61	61
July	63	62	66	68	67	72	71	71	75	71	63	66
August	71	70	74	78	76	-	77	77	78	76	-	73
September	67	59	70	75	78	77	73	71	70	72	-	70
October	71	68	73	77	75	76	76	77	76	75	72	74
November	65	65	67	63	60	62	62	57	57	57	49	56
December	69	67	73	79	75	77	77	76	77	75	68	71
	-	-	-	-	73	71	76	76	76	73	66	69

Meteorological Data 1970

Mean Monthly Relative Humidity

Month	Belize Int'l Airport	St. John's College Landivar	Yo Creek Agstat	Cabbage Waul	Melinda For. Station	Central Farm	Augustine Pineridge	Cooma Cairn	Sibun Hill	Savannah Forest Station	Stann Creek Agstat	Big Falls Ranch	Ambergris Caye	Punta Gorda Agstat
January	-	NR	87	87	93	88	80	92	92	82	85	88	NR	83
February	-	NR	82	92	93	84	80	91	93	78	81	85	NR	87
March	-	NR	84	87	87	80	65	80	80	72	78	84	NR	82
April	-	NR	85	91	89	74	59	72	73	66	77	70	NR	73
May	76	NR	82	89	89	79	64	69	74	62	74	70	NR	82
June	82	NR	85	89	-	77	74	80	87	-	82	82	NR	88
July	83	NR	86	87	90	84	82	79	87	79	83	82	NR	85
August	77	NR	87	90	91	83	85	81	84	72	84	84	NR	86
September	79	NR	89	89	93	81	84	87	85	83	85	82	NR	87
October	80	NR	87	91	92	85	84	90	91	81	86	86	NR	88
November	82	NR	86	-	-	85	85	90	84	-	84	80	NR	82
December	72	NR	87	93	91	88	87	91	92	84	86	85	NR	83

Note: Rainfall in Inches. Temperature in degrees Fahrenheit. Relative Humidity as percentages

Records prepared from morning readings taken at 09:00 hours.

APPENDIX III

CATTLE POPULATION ---- December, 1970

Distribution of Herds According to Size and District

No. of Cattle	NUMBER OF HERDS					Whole Country	
	NUMBER		HERDS				
	BELIZE	CAYO	COROZAL	ORANGE WALK	STANN CREEK		TOLEDO
1 - 10	96	106	13	487	15	63	780
11 - 25	51	129	6	97	6	19	308
26 - 50	16	62	3	39	4	4	128
51 - 100	13	40	-	3	6	3	65
101 - 500	4	19	-	7	2	2	34
501 - 1000	1	3	-	1	-	-	5
over 1000	-	2	-	-	-	-	2
TOTALS	181	361	22	634	33	91	1322

APPENDIX IV

CATTLE POPULATION, December, 1970

Distribution of Cattle According to Sex and District

DISTRICT	BULLS	COWS & HELPERS	STEERS	TOTAL
Belize	942	3997	339	5278
Cayo	2778	15176	5244	23198
Corozal	69	178	-	247
Orange Walk	1450	5567	339	7356
Stann Creek	138	679	79	896
Toledo	243	1061	120	1424
TOTAL	5620	26658	6121	38399

APPENDIX V

SLAUGHTER STATISTICS 1970

DISTRIBUTION BY DISTRICTS

DISTRICT	CATTLE			PIGS		
	No.	DRESSED WT. LBS.	AV. DRESSED WT. LBS.	No.	DRESSED WT. LBS.	AV. DRESSED WT. LBS.
BELIZE	2,382	777,327	326	4,710	304,530	65
COROZAL	230	61,848	269	51	3,621	71
CAYO	323	88,255	242	828	73,222	88
ORANGE WALK	203	64,494	318	586	41,411	71
STANN CREEK	125	37,757	302	101	9,391	93
TOLEDO	47	15,836	333	266	16,238	61
TOTAL 1970	3,310	1,045,517	316	6,542	448,413	69
TOTAL 1969	3,081	960,630	312	5,602	418,960	75

APPENDIX VI

List of Senior Personnel as at December 31st, 1970

<u>Post</u>	<u>Name</u>	<u>Station</u>
Chief Agricultural Officer	E.W. King	Belmopan
Principal Agricultural Officer	A.L. Navarrete	"
" " "	G.C. Ellis	Central Farm
Veterinary Officer	G. Calderbank	Belize City
" "	B.M. Silva	Central Farm
Livestock Officer	O.O. Orio	Orange Walk
" "	E.E. Juan	Central Farm
Plant Pathologist	J.E. Link	" "
Agricultural Irrigation Officer	L.B. Frutos	" "
Agricultural Officer	R.S. Pitt	Belmopan
" "	D.E. Belisle	Belmopan
" "	C.G. Santos	Orange Walk
" "	N.E. Wade	Central Farm
" "	R.H. Neal	" "
" "	N. Arzu	Belmopan
Mechanical Superintendent	N.E. McKenzie	Central Farm
Farm Planning Officer	M.E. Avila	" "
Assistant Agricultural Officers	T.L. Brackett	Stann Creek
" " "	W.J. Baeza	Corozal
" " "	A.P. Bautista	Toledo
" " "	F.B. Arana	Cayo
" " "	H.A. Reyes	Corozal
" " "	G.J. Flowers	Belize

APPENDIX VII

AGRICULTURAL EXPORTS - 1970

<u>ARTICLE:</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>VALUE (B.H. \$)</u>
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Livestock and Livestock Products:

Bovine Cattle	Heads	34	8,200
Sheep, Lamb, and Goats	"	7	110
Swine (live)	"	2,070	183,899
Poultry (live)	"	24,619	53,281
Horses, asses, mules	"	2	900
Eggs	Dozen	10,281	7,965

Fruits and Vegetables, Fresh and Processed:

Oranges, Fresh	Lbs.	2,376,585	46,866
Tangerines, Fresh	"	1,150	29
Bananas	Bunches	815	327
Plantains	"	6,821	3,544
Coconuts	Whole Nuts	93,350	10,945
Other Fresh Fruits	Lbs.	241,154	12,255
Dried Fruits	"	65,925	32,905
Grapefruit, Fresh	Lbs.	19,169	342
Fruit and Vegetable Juice, Unfermented	"	25	25
Orange Juice	"	5,501,525	666,590
Grapefruit Juice	"	482,205	47,687
Grapefruit Segments	"	9,167,853	1,706,325
Orange Concentrate	"	4,077,169	1,520,527
Grapefruit Concentrate	"	76,775	15,396
Grapefruit Oil	"	910	591
Orange Oil	"	101,105	80,934
Tomatoes, Fresh	"	21,036	2,099
Cabbages "	"	200	15
Cucumbers "	"	7,839,268	186,108
Other Fresh Vegetables	"	12,536	250

Other Crops:

Raw Sugar	"	131,342,400	11,142,271
Molasses	Tons	21,554	759,244
Natural Honey	Lbs.	92,879	11,620
Cocoa Beans	"	37,010	7,782
Pepper and Pimiento	Lbs.	153,015	155,204
Spice	"	2,240	2,900
Tobacco, Unmanufactured	"	26	25
Ground Nuts	"	600	620
Rice	"	11,000	1,650
R.K. Beans	"	537,085	97,226

APPENDIX VIII
CLINICAL CASES WHOLE COUNTRY
YEAR 1970

CONDITION	HORSE	CATTLE	SHEEP	PIGS	DOGS	CATS	POULTRY	OTHERS
Ecto. Parasites	85	252	12	230	59	1	242	
Endo. Parasites	54	250	1	240	108	-	-	
Distemper					96			
Enteritis	6	12		32	30		302	
Leptospirosis					11			
Allergy		2			27			
Resp. Infections &								
Pneumonia	46	21		69	33	5	1125	
Eye Infection	1	14		5	8			
Poisoning	2	375		20	3		82	
Injury Wounds	8	24	2	5	35	1		1
Surgery		2		1	9			
Urinary Infection		1		1	8			
Prolapse	1	4		5				
Foot Rot	1				4			
Prev. of Oestrus					5			
Colic	7							
Tumour					5			
Gastration	28	58	11	334	11			
Fowl Corya								5
Stomatitis		1						
Mastitis		15		1				
Haemoglobinemia	3							
Fowl Cholera							11	
Botulism							5	
Metritis	3	2						
Myiasis		7		2	2			
Bloat		2						
Anaplasmosis		7						
Piroplasmiasis		22						
Tetanus				1				
Humane Disposal	3			1	27	7		1
Miscellaneous	50	343	35	142	6		1216	
Ear Infection	1				5			
Oedema		1		2				
Malnutrition	2			1	11			
Haematomata		1			1			
Constipation				1	1			
Uterus bleeding		1						
<u>Vaccination</u>								
Rabies		53			170	6		
Distemper					18			
Leptospirosis					19			
Tetanus	14							
Swine Fever				402				
Fowl Pox							322	
TOTAL 1970	312	1468	61	1438	710	20	3299	2
TOTAL 1969	251	505	137	1109	434	19	2543	

APPENDIX IX

LABORATORY REPORT 1970

	HORSE	CATTLE	SHEEP	PIGS	DOGS	CAT	POULTRY	OTHER
<u>HELMINTHS</u>								
<u>A. Round worm</u>								
Haemonchus Contortus	-	180	10	-	-	-	-	-
Strongyloides	9	2	-	-	-	-	-	-
Strongylus	21	-	-	-	-	-	-	-
Syostrogylus Rubidus	-	-	-	11	-	-	-	-
Ascaris Lumbricoides	-	-	-	4	-	-	-	-
Nematodirus	-	5	-	-	-	-	-	-
Ascaris Equorum	11	-	-	-	-	-	-	-
Parascaris Equorum	7	-	-	-	-	-	-	-
Ascaris Sp.	-	10	-	7	-	-	-	-
Ancylostoma Pahinum	-	-	-	-	26	-	-	-
Dirofilaria	-	-	-	-	31/46	-	-	-
<u>B. Tape Worm</u>								
Taenia	-	-	-	1	1	-	-	-
Dipylidium Caninum	-	-	-	-	58	-	-	-
Moniezia	-	20	-	-	-	-	-	-
<u>Protozoa</u>								
Anaplasma	-	8/27	-	-	-	-	-	-
Babesia	3/15	21/60	-	-	0/6	-	-	-
Coccidia	-	40	-	-	-	-	9	-
<u>Bacteria</u>								
Clastridium	-	-	-	2/2	-	-	-	-
Actinomyces	-	1/1	-	-	-	-	-	-
Streptococci	-	12/18	-	-	4/11	-	-	-
Staphylococci	1/2	3/7	-	-	4/5	-	-	-
<u>Ectoparasites</u>								
Demodetic Mange	3/9	-	-	0/7	6/20	0/6	-	-
Sarcoptic Mange	-	-	-	-	5/20	-	-	-
<u>Agglutination Test</u>								
Brucellosis	-	2/47	-	-	-	-	-	-
Leptospira	-	-	-	2/27	6/20	-	-	-
<u>Urine Test</u>								
P.M. Examination	0/3	-	-	-	-	-	-	-
	2	12	1	12	81	2	15	9
TOTAL	79	429	11	71	274	8	24	9

Total No. of Examination = 905

APPENDIX X

DISEASES SEEN AT MEAT INSPECTION

1970

DISEASE	SPECIES		
	CATTLE	PIGS	SHEEP
Tuberculosis	1	2	
Tumors (a) Malign. with metast.		3	
(b) Benign (simple)	1	3	
Melanosis		11	
Liver (a) Cirrhosis		383	
(b) Telangiectasis	44		
Abscesses	7	40	
(a) Ascaris Lumbric		2	
(b) Steph. dentatus		235	
(c) Cyst. Cellulosae		9	
(d) Liver Fluke	2		
(e) Lung worms	2	375	3
(f) not specific	1	51	5
Congestion of lungs	34	50	1
Bruising extensive & severe	6	2	
Oedema and poor condition	1	1	
Necrosis (a) Lungs	32	176	2
(b) Liver	2	59	
(c) other areas	5	59	
Other conditions (specify)			
Hydronephrosis	9	36	

